DISTRIBUTION AND ABUNDANCE OF *EUPATORIUM LEUCOLEPIS* VAR. *NOVAE-ANGLIAE*

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Although *Eupatorium leucolepis* (DC.) Torrey & Gray had been known as a rare member of the New England flora since 1908 (Fernald, 1911), it was not until 1937 that M. L. Fernald recognized the varietal status of these plants, which inhabit a few of the pond shores of that region. In his brief formal description of the variety Fernald (1937) gives several good characters by which *novae-angliae* can be distinguished from nominate *leucolepis*, which occurs locally from Louisiana and Florida to New Jersey and rarely to Long Island, New York. All herbarium and field material that I have examined from New England are clearly referrable to *novae-angliae*. Fernald cited specimens from five ponds in Plymouth County, Mass. and two ponds in Washington County, Rhode Island; so far as I can determine from available herbarium specimens, these seven ponds constituted the total known range of the taxon at that time and, in fact, until this study. Fernald provided no information on abundance, and there are no collections more recent than 1930. For these reasons the plant has been proposed for federal listing as "Threatened" by the Smithsonian Institution (1975) and by Ayensu and DeFelipps (1978), and placed in category 2 (more study needed) by the Office of Endangered Species (1980).

In conjunction with other studies conducted during 1973–1975, I visited nearly every natural pond, large and small, in southeastern Massachusetts and southern Rhode Island, including all historical sites for the plant. Thus it is likely that the localities enumerated below support practically the whole population of the variety *novae-angliae*. Many of the ponds were revisited in 1979 and 1980, when voucher specimens were collected; these are deposited at the NEBC herbarium and my own. In addition, J. A. Coddington visited the Plymouth county sites in 1978 while preparing a status report for the U.S. Fish & Wildlife Service (Coddington & Field, 1978).

The list of localities is compiled from my own field work and from specimens at the following herbaria: BRU, GH, MASS, NEBC, RI. All stations, whether extant or not, are included. Ownership, unless otherwise stated, refers to land down to the "natural high water

mark"; the water and the land thereunder normally are property of the State.

Note: population estimates given by Coddington are of discrete clumps (counted as one plant) and solitary plants of all ages, whereas I only counted each flowering shoot, whether clumped or not. Censusing techniques are necessarily somewhat arbitrary due to the difficulty of distinguishing between clumps consisting of a single, multiple-shoot plant and those consisting of several individual plants.

PLYMOUTH COUNTY, MASSACHUSETTS

1. **Muddy Pond, Kingston.** Moist cobbly-sandy shores, 475 flowering shoots counted 2 September 1975, 1700 flowering shoots 3 September 1980: *Sorrie 715* (NEBC), ca. 2000 clumps counted by Coddington 27 August 1978. Privately owned by a Catholic Order, which operates a summer camp there.

2. **Smelt Pond, Kingston.** Specimen: Shore, 30 August 1908, *W. P. Rich & C. H. Knowlton, s.n.* (GH). The first specimen of *E. leucolepis* taken in New England. No plants present here, nor at adjacent Little Smelt Pond, in August 1973, 9 August 1975, 13 September 1979, nor in 1978 by Coddington. Privately owned and used by seasonal residents, a scout camp, and a cranberry grower.

3. **Loon Pond, Lakeville.** Specimens: Damp sandy shore, 20 August 1913, ISOTYPE, *M. L. Fernald & B. Long 10492* (NEBC). Damp sandy shore, 26 August 1913, *M. L. Fernald & B. Long s.n.* (NEBC). Sphagnous grassy place, 10 September 1930, *S. F. Blake 11287* (GH). No plants present in August 1974 nor 1 September 1975, but 7 flowering shoots were found in damp sandy soil 10 September 1979: *Sorrie 249* (NEBC) and 5 on 26 August 1980. Coddington found none in 1978. Privately owned and used by residents and an athletics camp.

4. **Cook's Pond, Plymouth.** Damp sandy shore, a single plant blooming among *Vaccinium atrococcum* (Gray) Heller shrubs 19 August 1975; none present 2 September 1979 nor 26 August 1978 by Coddington. Privately and municipally owned (partly bordered by a town forest) and used by residents, a cranberry grower, and picknickers.

5. **Great South Pond, Plymouth.** Cobbly-sandy and moist sandy shores, less than 100 flowering shoots found in August 1973, 250 shoots in bud or flower 12 August 1975, less than 75 flowering shoots 2 September 1979: *Sorrie 239* (NEBC), 160 shoots 7 August and 8 October 1980, and 199 clumps counted by Coddington 26 August 1978. Municipally owned as a water supply, but numerous private residences are situated along the shores where the plants grow.

6. **Harlow Pond, Plymouth.** Sandy-peaty border, 16 shoots finishing blooming 22 September 1975, 72 shoots blooming there 2 September 1979: *Sorrie 245* (NEBC), 103 clumps counted by Coddington 27 August 1978. Privately owned, including the water.

7. **"King" Pond, Plymouth.** Specimen: Gravelly upper beach, 6 plants, 30 August 1928, *M. L. Fernald & L. Griscom 1076* (NEBC). Current topographic maps (USGS, 1977) identify what is no doubt this pond as Kings Pond. No plants present in August 1973, 26 & 29 August 1975, 2 September 1979, nor in August 1978 by Coddington. Privately owned and used by residents.

8. **Little Micajah Pond, Plymouth.** Sandy-peaty border, ca. 100 shoots found in August 1973, 150 shoots in bud 19 July 1975, 285 shoots blooming 2 September 1979: *Sorrie 242* (NEBC), 223 clumps counted by Coddington 26 August 1978. Privately owned, including the water, and used by residents.

9. **Little Widgeon Pond, Plymouth.** Moist to dry sandy shores, 13 shoots blooming 23 August 1975, 25 shoots blooming 2 September 1979: *Sorrie 243* (NEBC), 30 clumps counted by Coddington 27 August 1978. State-owned, part of the Myles Standish State Forest.

10. **Micajah Pond, Plymouth.** Specimen: Muddy pond margin, 13 September 1925, *L. B. & F. E. Smith, Jr., s.n.* (NEBC). No plants present in August 1973, 19 July & 5 September 1975, nor 2 September 1979. On the original collection label there is no pond named, yet in his description of the variety Fernald (1937) cites "Micajah's" as the locality. The extant station at Little Micajah Pond lies less than 30m from the southeast shore of Micajah, so the former is possibly the Smiths' locality. Privately owned and used by residents.

11. **Triangle Pond, Plymouth.** Specimen: Edge, 26 August 1928, *L. Griscom 12706* (NEBC). There are two ponds with this name in the town of Plymouth, plus a third named South Triangle Pond; none supported any *novae-angliae* on various dates from 1973–1975. Apparently Griscom collected his specimen at the Triangle Pond near current routes 44 and 80, for on 1 September 1979 197 shoots were blooming in moist sandy to sandy-peaty soil: *Sorrie 237* (NEBC). Coddington counted 80 clumps 4 September 1978. Privately owned and used by residents.

NEWPORT COUNTY, RHODE ISLAND

12. **Beavertail Point, Jamestown.** Some 35 plants grow in "permanently damp soil of an open swale" (Champlin, pers. comm.) near the southern end of Conanicut Island. Colony discovered by R. L. Champlin. Ownership has been recently transferred from the U.S. Navy to the State; proposals for development as a state park threaten the site (Church, 1980).

WASHINGTON COUNTY, RHODE ISLAND

13. **Hot House Pond, South Kingstown.** Cobbly-sandy point, a few small shoots without blooms 10 September 1975. Privately owned, including the water, and used by residents.

14. **Lily Pond, South Kingstown.** Sandy-gravelly cove, 2 shoots blooming 10 September 1975. Privately owned, including the water, and used by residents.

15. **Long Pond, South Kingstown.** Specimen: Sandy and peaty shore, 5 September 1914, *J. F. Collins & M. L. Fernald 11444* (GH, NEBC). On 10 September 1975 180 shoots were blooming there. Privately owned and used by residents.

16. **White Pond, South Kingstown.** Sandy coves, 8 shoots blooming 10 September 1975. Privately owned and used by residents.

17. **South Kingstown.** Specimen: Granitic gravel and sand about small pond east of Long Pond, 5 September 1914, *J. F. Collins & M. L. Fernald,* Plant. Exsicc. Gray. 280 (GH, NEBC). This pond may

be #13, 14, or 16 above, or perhaps one of the Spectacle Ponds (USGS, 1971) which I was unable to visit.

DISCUSSION

Of the seventeen localities only twelve are definitely known to harbor current stands of *novae-angliae,* yielding a total population estimate of only 2500 mature plants. As is obvious from Coddington's counts and mine (despite different methodology) the number of plants which emerge and bloom varies considerably from year to year, due to the marked fluctuations in the water level of the ground-water ponds that the variety inhabits. The propensity of *novae-angliae* to grow only along the drier, uppermost reaches of the pond margin was observed at every pond where I found the plant. This habit may be related to the plant's water tolerance during the growing season, or more likely to its inability to survive extended periods of time submerged during consecutive high-water years. This variety is perennial and can reproduce vegetatively from the caudex-like base, but such questions as how long it can survive without photo-synthesizing, and what minimum depth of water will prevent it from sending up shoots in a given year are not known.

Even though ten new stations were found during field work, it is noteworthy that they represent only a small fraction of the habitat apparently available to the variety. I visited at least 300 other ponds which supported anywhere from a few to many other Coastal Plain species, but which were devoid of *novae-angliae*.

Three of the seven historical stations have been destroyed, all apparently due to shorefront development and recreational activities. Construction of major highways has made rural areas accessible and desirable, so that homes are being built around the shores of many fine and botanically rich ponds. Planned highway construction now threatens station No. 1. Despite State ownership of the water and land under it at ponds over ten acres in size (Nos. 1–5, 7, 10, 11, 15, 16), there is no legal protection given to the plant life. Only at stations 5 and 9 is some measure of safety provided, due to the nature of ownership and usage of the ponds. Thus *none* of the stands of *novae-angliae* are in any way permanently preserved.

I favor retention of "Threatened" status for *Eupatorium leucolepis* var. *novae-angliae* and strongly urge that steps be taken to insure continued survival in native habitat.

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LITERATURE CITED

AYENSU, E. S., & R. A. DEFELIPPS. 1978. Endangered and Threatened Plants of the United States. Smithsonian Inst. & World Wildlife Fund, Inc., Washington, D.C. 403pp.

CHURCH, G. L. 1980. Plant Conservation Concerns in Rhode Island. Rhodora **82**: 145–149.

CODDINGTON, J. A., & K. G. FIELD. 1978. Status Report: *Eupatorium leucolepis* var. *novae-angliae* in Massachusetts. Prepared on contract for U.S. Fish & Wildlife Service, Newton Corner, Mass. (unpublished). 7pp.

FERNALD, M. L. 1911. A Botanical Expedition to Newfoundland and Southern Labrador. Rhodora **13**: 152.

_____. 1937. Plants of the Inner Coastal Plain of Virginia. Rhodora **39**: 453–454, plate 485.

OFFICE OF ENDANGERED SPECIES, U.S. Fish & Wildlife Service. 1980. Endangered and Threatened Wildlife and Plants: Review of Plant Taxa for listing as Endangered or Threatened Species. Federal Register 15 December 1980.

SMITHSONIAN INSTITUTION. 1975. Report on Endangered and Threatened Plant Species of the United States. U.S. Gov. Print. Off., Washington, D.C. 200pp.

UNITED STATES GEOLOGICAL SURVEY. 1977. Plymouth Mass. quadrangle, 7.5 minute series (topographic), Washington, D.C.

_____. 1970. Kingston, R.I. quadrangle, 7.5 minute series (topographic), Washington, D.C.

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